

REMARKS

This application has been carefully reviewed in light of the Office Action dated May 14, 2008. Claims 1, 2 and 4-9 remain in this application. Claim 1 is the independent Claim. Claims 1 and 7 have been amended. Support for the new amendments is found, *inter alia*, in paragraphs [0034], [0037], [0042] and in Figs. 1 and 3 of the present Specification. Claim 3 has been canceled, without prejudice. It is believed that no new matter is involved in the amendments or arguments presented herein.

Reconsideration and entrance of the amendment in the application are respectfully requested.

Non-Art Based Rejections

Claim 7 was rejected under 35 U.S.C. § 112, second paragraph, for insufficient antecedent basis. In response, Applicant has amended Claim 7 as suggested in the Office Action.

Reconsideration and withdrawal of the above § 112 rejection are respectfully requested.

Art-Based Rejections

Claims 1-6 were rejected under 35 U.S.C. § 103(a) as obvious over U.S. Patent No. 4,795,500 (Kishi); Claim 7 was rejected as obvious over Kishi in view of U.S. Patent No. 6,274,804 (Psyk); Claim 8 was rejected as obvious over Kishi in view of U.S. Patent No. 4,773,943 (Yamaguchi); Claim 9 was rejected as obvious over Kishi in view of Yamaguchi and of U.S. Patent No. 4,166,918 (Nostrand).

Applicant respectfully traverses the rejections and submits that the claims herein are patentable in light of the clarifying amendments above and the arguments below.

The Kishi Reference

Kishi is directed to a photovoltaic device for partially transmitting incoming light. Holes are provided to have a circular form of 0.1 to 3 mm in diameter (*See, Kishi; Abstract and Col. 2, lines 63-68*).

The Psyk Reference

Psyk is directed to a substrate 1, which is a transparent glass wafer (*See, Psyk; Col. 3, lines 28-35*).

The Yamaguchi Reference

Yamaguchi is directed to forming holes 51 using a Nd-YAG laser (*See, Yamaguchi; Col. 11, lines 13-20*).

The Nostrand Reference

Nostrand is directed to applying a reverse bias voltage (*See, Nostrand; Nostrand*).

The Claims are Patentable Over the Cited References

The present application is generally directed to a thin-film solar cell module.

As defined by amended independent Claim 1, a transparent thin-film solar cell module includes a multilayer film including a first electrode layer, a semiconductor layer and a second layer are stacked in that order on a main surface of a transparent insulating substrate. A cell region includes a plurality of photoelectric conversion cells connected in series. A plurality of light-transmissive aperture holes in the cell region are provided. the plurality of light-transmissive aperture holes are formed along lines arranged at intervals in a range of 0.5 mm to 3 mm and each crossing the cells connected in series by removing at least the second electrode layer and the

semiconductor layer with irradiation of laser light. The light-transmissive aperture holes each have a diameter in a range of 30 μm to 500 μm . The plurality of light-transmissive aperture holes are disposed in a line at a distance between the centers of the light-transmissive aperture holes of 1.01 to 2 times the diameter of each light-transmissive aperture hole.

The applied reference fails to disclose or suggest the above features of the claims of the present invention. In particular, the applied reference fails to disclose or suggest "along lines arranged at intervals in a range of 0.5 mm to 3 mm and each crossing said cells connected in series by removing at least the second electrode layer and the semiconductor layer with irradiation of laser light, the light-transmissive aperture holes each having a diameter in a range of 30 μm to 500 μm ," as required by amended independent Claim 1 of the present invention.

Kishi is directed to a photovoltaic device for partially transmitting incoming light. (*See, Kishi; Abstract and Col. 2, lines 63-68*). In the photovoltaic device of Kishi, holes 6 are uniformly distributed in light admitting region PR.

In contrast to Kishi, the transparent thin-film solar-cell module of the present invention includes the aperture holes of a diameter in the range of 30 μm to 500 μm that are distributed with a center-to-center distance of 1.01 to 2 times the diameter along lines arranged at intervals in a range of 0.5 mm to 3 mm and each crossing the cells connected in series. Advantageously, with such a diameter of the aperture holes as in the present invention, a background or an image observed via the transparent thin-film solar-cell module can have sufficient definition, luminance, and resolution without causing significant decrease of the photoelectric conversion efficiency compared to that of prior art (*See, Specification, Paragraph [0042]*)

Furthermore, while holes 6 of Kishi are formed by etching (*See, Kishi, Col. 2, lines 63-65*), the aperture holes of the present invention are formed by laser irradiation.

It is possible to morphologically distinguish a hole formed by etching and a hole formed by laser irradiation from each other. Conventionally, etching is a complicated process and requires a resist and a mask. In the present invention, on the other hand, the aperture holes are formed by laser irradiation that is an easy way and also used for the integration process of the cells in the solar-cell module. This is another advantage of the present invention over the prior art.

Thus, Kishi does not disclose or suggest this feature of the present invention as required by amended independent Claim 1. The ancillary references do not remedy the above noted deficiencies of Kishi.

Since the applied reference fails to disclose, teach or suggest the above features recited in amended independent Claim 1, this reference cannot be said to anticipate nor render obvious the invention which is the subject matter of that claim.

Accordingly, amended independent Claim 1 is believed to be in condition for allowance and such allowance is respectfully requested.

The remaining claims depend either directly or indirectly from amended independent Claim 1 and recite additional features of the invention which are neither disclosed nor fairly suggested by the applied references and are therefore also believed to be in condition for allowance. For example, with respect to dependent Claim 7, it is noted that Claim 7 requires "the back sealer is composed of a fluorocarbon resin or glass." However, Fig. 11 and col. 3, lines 28-36 of Psyk merely teach a front substrate 1 made of a glass wafer. Neither a back substrate nor a back substrate made of glass is disclosed or suggested by Psyk. Therefore, the assertion on page 6 of the Office Action that it is well known in the solar-cell art to utilize fluorocarbon or glass as the back sealer is not supported by Psyk and further distinguishes the present application over Kishi and Psyk.

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Conclusion


In view of the foregoing, it is respectfully submitted that the application is in condition for allowance. Reexamination and reconsideration of the application, as amended, are requested.

If for any reason the Examiner finds the application other than in condition for allowance, the Examiner is requested to call the undersigned attorney at the Los Angeles, California telephone number (310) 785-4721 to discuss the steps necessary for placing the application in condition for allowance.

If there are any fees due in connection with the filing of this response, please charge the fees to our Deposit Account No. 50-1314.

Respectfully submitted,
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